

LIQUID ADDITIVE IS COOL FOR AIR CONDITIONERS

A liquid additive for air conditioners, heat pumps, and refrigeration systems improves cooling performance by boosting capacity and efficiency.



■ QwikBoost™ (pictured above) is expected to increase the cooling capacity of automobile air conditioners by 10 percent and cool the passenger space of vehicles faster than existing technology.

On hot days, does your car feel more like an oven? Summer heat can raise temperatures to dangerous levels, especially inside a car. And many people do not realize how quickly a car's interior can heat up—even with the windows down several inches. For example, when the outside temperature is 83°F, the temperature inside your car can reach 109°F in just 15 minutes.

Unfortunately, there is little to keep you from roasting before the air conditioning kicks in. And, once it does, the supply of cool air never seems to be enough.

This summer, automotive air conditioners will be better prepared to beat the heat, thanks to a liquid performance additive developed by Mainstream Engineering Corporation (Rockledge, FL). Called QwikBoost™, the new additive is expected to boost cooling capacity by 10 percent. It will also cool the interior of vehicles faster than existing technology. Mainstream Engineering has packaged its additive and a small quantity of R-134a refrigerant in a single-dose 3-ounce can, soon to be available at local automotive supply outlets.

Easy work. When added to a vapor compression air conditioner, heat pump, or refrigeration system, the additive significantly improves the coefficient of performance (COP) of the system, thereby reducing its energy consumption. The COP is a measure of system efficiency as indicated by the ratio of cooling output to the input energy. QwikBoost circulates through the refrigeration system with the working fluid. It increases the available cooling capacity (latent heat) of the refrigerant during the evaporation process, thereby resulting in better performance.

Mainstream Engineering developed the initial technology under BMDO SBIR contracts for advanced heat pumps for spacecraft heat rejection systems. This effort evaluated four heat pump configurations for use as spacecraft heat rejection systems. One of these system evaluations, based on a chemical/mechanical heat pump, led to the development of the performance-enhancing additive. Subsequent development work was performed under NASA and Air Force SBIR contracts.

One concern about using liquid additives in air conditioning equipment has been whether these products adversely affect system lubrication or compressor life. "Lubrication tests, performed at an independent laboratory, and compressor life tests have indicated that QwikBoost does not adversely affect compres-

sors,” says Larry Grzyll, Mainstream Engineering’s senior chemical engineer. “In fact, test results show that a QwikBoost/lubricant mixture produces less wear than the pure polyol ester refrigeration lubricant typically used in today’s refrigeration systems.”

Another benefit of QwikBoost is that it enhances air conditioner performance without adversely affecting the environment. A few years ago, environmental regulations forced automobile manufacturers to replace systems using R-12 air conditioner coolant, which contains chlorofluorocarbons, with less-polluting systems using R-134a coolant—a move that left consumers underwhelmed with the lower performance of the new and retrofit systems. Mainstream is marketing QwikBoost as a solution to these performance problems. Of the 150 million air-conditioned cars on the road today, roughly 90 million still use R-12 coolant.

Award winner. Mainstream Engineering has a strong and ongoing commitment to commercializing QwikBoost. The U.S. Small Business Administration has recognized this commitment and honored the company with one of its annual Tibbetts Awards in 1997. The Tibbetts Awards recognize superior SBIR technological innovation, economic impact, and business achievements. Less than a year later, QwikBoost was first introduced at the International Air Conditioning, Heating, and Refrigeration Exposition in San Francisco, California.

Mainstream Engineering believes that the additive also could be used for industrial and commercial medium-temperature refrigeration, such as supermarket refrigerated cases. This market is very significant in that refrigeration represents more than half the energy consumed by the U.S. food sales sector. For example, the U.S. food sales sector in 1995 consumed about 71 trillion British thermal units (Btus) of energy for refrigeration out of its total consumption of 137 trillion Btus. According to these numbers, refrigeration accounted for roughly 52 percent of the total energy consumed by this sector.

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What Does It Mean to You?

QwikBoost will help automotive air conditioners cool the interior faster and produce more cool air, enabling occupants to beat the heat on hot summer days.



What Does It Mean to Our Nation?

QwikBoost can help boost the performance of the Nation’s industrial and commercial refrigeration equipment, which plays a critical role in preserving food and storing medical supplies.

Tech Trivia

Which automobile manufacturer first introduced air conditioning in several of its 1941 models?

- A. Hupmobile
- B. Packard
- C. Graham-Paige
- D. American Bantam

For the answer, see page 73.